



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,946	10/05/2005	Seok Koo Kim	LEE-0033	3418
23413 7590 12/09/2008 CANTOR COLBURN, LLP 20 Church Street 22nd Floor Hartford, CT 06103				
EXAMINER MARTIN, ANGELA J				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
12/09/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

## Office Action Summary

**Application No.**

10/551,946

**Applicant(s)**

KIM ET AL.

**Examiner**

ANGELA J. MARTIN

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This Office Action is responsive to the Remarks filed on September 2, 2008. However, a new rejection is presented for the following reasons of record.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim, KR 1020000014672 (machine translation) in view of Maeda et al., U.S. Pat. No. 6,287,723 B1.

Rejection of claims 1-12 drawn to an anode active material.

Kim teaches an anode active material slurry comprising: (a) a carbon-based anode active material, that is capable of lithium ion intercalation/deintercalation (Li-ion secondary battery) (abstract); (b) a conductive agent (section 10); (c) a binder comprising a styrene-butadiene-based polymer resin (section 10); (d) a thickener comprising a cellulose-based (section 18); and (f) water (section 18).

Kim does not teach a dispersant comprising a polymer backbone capable of surface-adsorption and a side-chain having non-ionic surfactant properties. The anode active material slurry according to claim 1, wherein the content of the dispersant ranges

from 0.01 wt % to 10 wt % based on the total weight of the anode active material slurry (solid content). The anode active material slurry according to claim 1, wherein the polymer backbone in the dispersant is polymethylmethacrylate (PMMA) or polyvinylidene fluoride (PVdF). The anode active material slurry according to claim 1, wherein the side-chain having non-ionic surfactant properties in the dispersant is at least one selected from the group consisting of alkyl- and alkylaryl-polyoxyethylene ethers, alkylarylformaldehyde-condensated polyoxyethylene ethers, block polymers having polyoxypropylene as an oleophilic group, polyoxyethylene ethers of glycerin ester, polyoxyethylene ethers of sorbitan ester, polyoxyethylene ethers of sorbitol ester, polyethyleneglycol fatty acid esters, glycerin esters, sorbitan esters, propyleneglycol esters, sugar esters, fatty acid alkanol amides, polyoxyethylene fatty acid amides, polyoxyethylene alkylamines, amine oxides, alcohol ethoxylates, polyethylene oxide (PEO-based materials), alkyl phenol ethoxylates, fatty amine ethoxylates, glucosides, ethylene oxide-propylene oxide copolymers and alkanolamides. The anode active material slurry according to claim 1, wherein the dispersant is a copolymer formed of polymethylmethacrylate and polyethylene oxide. The anode active material slurry according to claim 1, wherein the dispersant has a weight average molecular weight ranged from 10,000 to 30,000. A lithium secondary cell comprising an anode obtained by using the anode active material slurry according to claim 1. The lithium secondary cell according to claim 7, wherein the content of the dispersant ranges from 0.01 wt % to 10 wt % based on the total weight of the anode active material slurry (solid content). The lithium secondary cell according to claim 7, wherein the polymer backbone in the

dispersant is polymethylmethacrylate (PMMA) or polyvinylidene fluoride (PVdF). The lithium secondary cell according to claim 7, wherein the side-chain having non-ionic surfactant properties in the dispersant is at least one selected from the group consisting of alkyl- and alkylaryl-polyoxyethylene ethers, alkylarylformaldehyde-condensated polyoxyethylene ethers, block polymers having polyoxypropylene as an oleophilic group, polyoxyethylene ethers of glycerin ester, polyoxyethylene ethers of sorbitan ester, polyoxyethylene ethers of sorbitol ester, polyethyleneglycol fatty acid esters, glycerin esters, sorbitan esters, propyleneglycol esters, sugar esters, fatty acid alkanol amides, polyoxyethylene fatty acid amides, polyoxyethylene alkylamines, amine oxides, alcohol ethoxylates, polyethylene oxide (PEO-based materials), alkyl phenol ethoxylates, fatty amine ethoxylates, glucosides, ethylene oxide-propylene oxide copolymers and alkanolamides. The lithium secondary cell according to claim 7, wherein the dispersant is a copolymer formed of polymethylmethacrylate and polyethylene oxide. The lithium secondary cell according to claim 7, wherein the dispersant has a weight average molecular weight ranged from 10,000 to 30,000.

Maeda et al., teach a polymer backbone in the dispersant is polyethylene oxide (col. 2, lines 56-67). It teaches the content of the dispersant is no more than 10 wt % based on the total weight of the anode active material slurry (col. 3, lines 17-20). It teaches polymer backbone in the dispersant is polyvinylidene fluoride (PVdF) (col. 7, lines 1-4). It teaches side-chain nonionic surfactant is preferably a polyoxyethylene alkyl ether such as polyoxyethylene lauryl ether, polyoxyethylene cetyl ether, polyoxyethylene stearyl ether or polyoxyethylene oleyl ether; polyoxyethylene alkyl aryl ether

such as polyoxyethylene nonyl phenyl ether or polyoxyethylene octyl phenyl ether; polyethylene glycol fatty acid ester, polyethylene glycol phosphate; sorbitol fatty acid ester; fatty acid monoglyceride; polyglycerine fatty acid ester; propyleneglycol fatty acid ester; cane sugar fatty acid ester, polyoxyethylene-polyoxypropylene block copolymer; polyoxyethylene-polyoxypropylene alkyl ether; ethylene oxide derivative of alkyl phenol formalin condensate; polyoxyethylene glycerine fatty acid ester, polyoxyethylene hardened castor oil; polyoxyethylene sorbitol fatty acid ester; fatty acid alkanolamide; polyoxyethylene fatty acid amide; and the like (col. 2, lines 59-67 and col. 3, lines 1-8). The molecular weight of the dispersant would fall within the claimed range of claims 6 and 12 because Maeda et al., teach the same non-ionic surfactants listed in claims 4 and 10.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to insert the teachings of Maeda et al., into Kim because Maeda et al., teach the non-ionic surfactant, when dispersed in the electrode slurry, is excellent in bonding strength and bonding durability. The incorporation of the dispersant of Maeda et al., into Kim would also be advantageous because Maeda also discloses, "The binder of the present invention is distinguished by enhanced binding strength resulting from the combination of the nonionic polymer and the water-repellent polymer. Also an increase of the battery's internal pressure by repeat of charge and discharge can be suppressed by the combination of the nonionic polymer and the water-repellent polymer, especially the fluorine containing polymer."

***Response to Arguments***

3. Applicant's arguments with respect to the secondary prior art of record, have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela J. Martin whose telephone number is (571)272-1288. The examiner can normally be reached on Monday-Friday from 10:00 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJM  
/Angela J. Martin/  
Examiner, Art Unit 1795